

FIG. 1

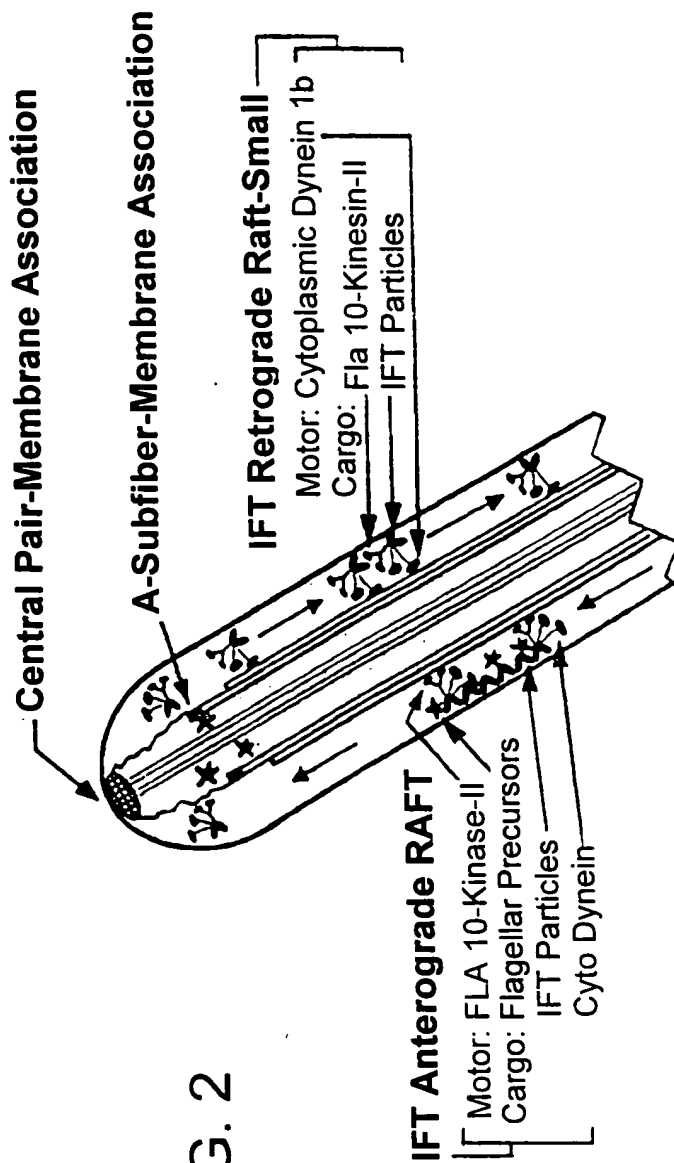


FIG. 2

Out = Pre-assembled axonemal proteins
(radial spokes, dynein arms)
In = Synthesized on free polysomes

IFT particle
Heterotrimeric Kinesin II
Cytoplasmic Dynein 1b

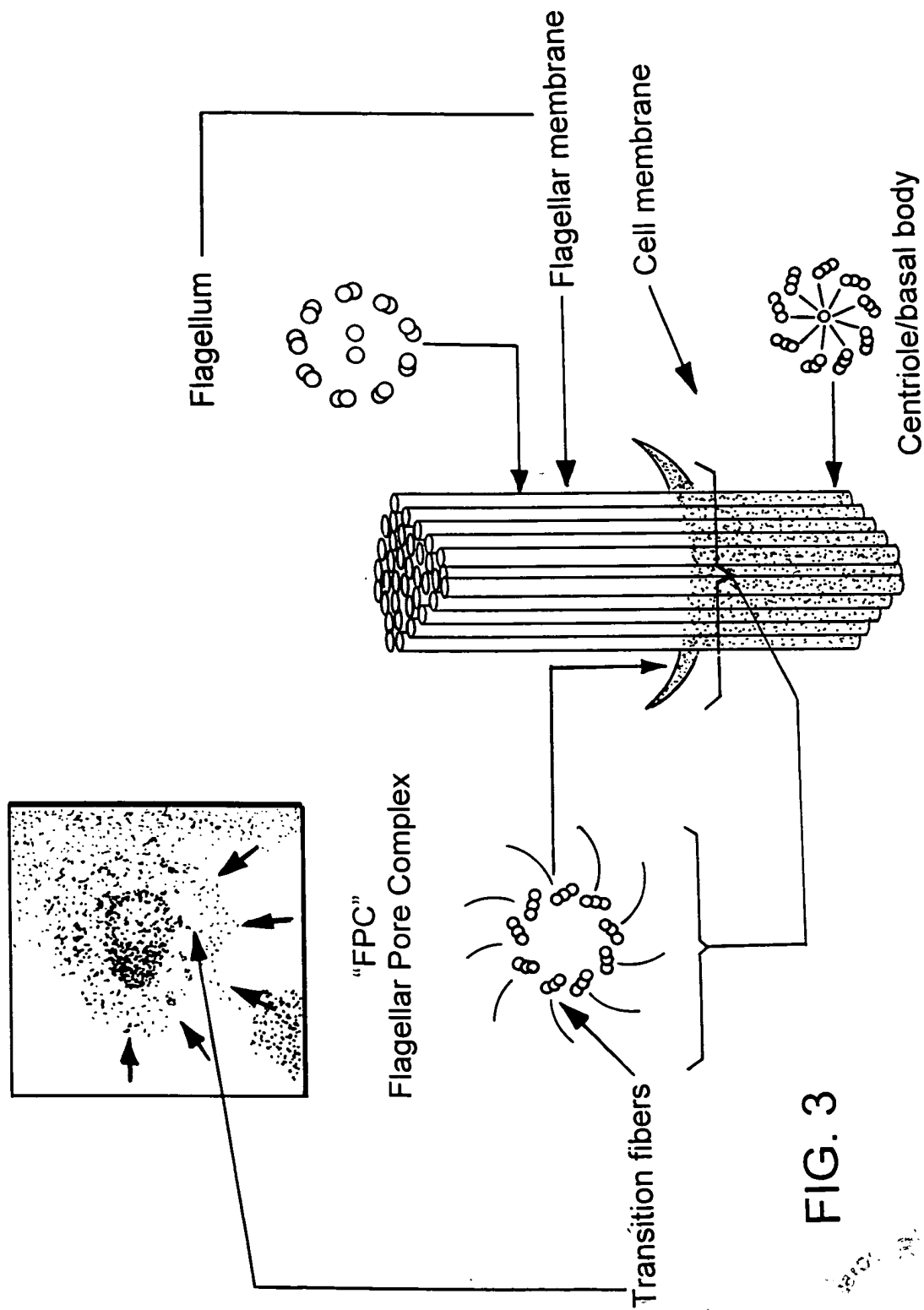






FIG. 3

The diagram illustrates the structure of a flagellum and the exclusion of cytoplasmic organelles from the flagellar zone. Key components labeled include:

- IFT RETROGRADE** and **IFT ANTEROGRADE**: Arrows indicating the direction of Intraflagellar Transport (IFT) particles along the flagellum.
- CENTRIN FILAMENTS**: Filaments located at the base of the flagellum.
- "RAFT" OF IFT PARTICLES**: A cluster of IFT particles near the base of the flagellum.
- ZONE OF EXCLUSION OF CYTOPLASMIC ORGANELLES**: The region where cytoplasmic organelles are excluded from the flagellar zone.
- FLAGELLAR MEMBRANE**: The membrane at the tip of the flagellum.
- TRANSITION REGION**: The region where the flagellum meets the cell body.
- TRANSITION FIBER AND FLAGELLAR PORE**: The structure connecting the flagellum to the cell body.
- CELL MEMBRANE**: The outer boundary of the cell.
- CENTRIN LIGAMENTS**: Structures connecting the centrin filaments to the cell body.
- NUCLEUS**: The central organelle containing genetic material.
- CHROMATIN**: The DNA material within the nucleus.
- CHLOROPLAST**: The organelle responsible for photosynthesis.
- GOLGI**: The organelle involved in protein processing and transport.
- RER** (Rough Endoplasmic Reticulum): The organelle involved in protein synthesis.

-  = IFT particle
 = Heterotrimeric Kinesin II
 = Cytoplasmic Dynein 1b
 = Free Polysomes
 = Microtubules





-  = Integral membrane proteins
 (Channels, etc.) (ER → Golgi)
-  = Pre-assembled axonemal proteins
 (radial spokes, dynein arms)
-  Synthesized on free polysomes
-  = Peripheral membrane
 (protein (ER → Golgi))

FIG. 4

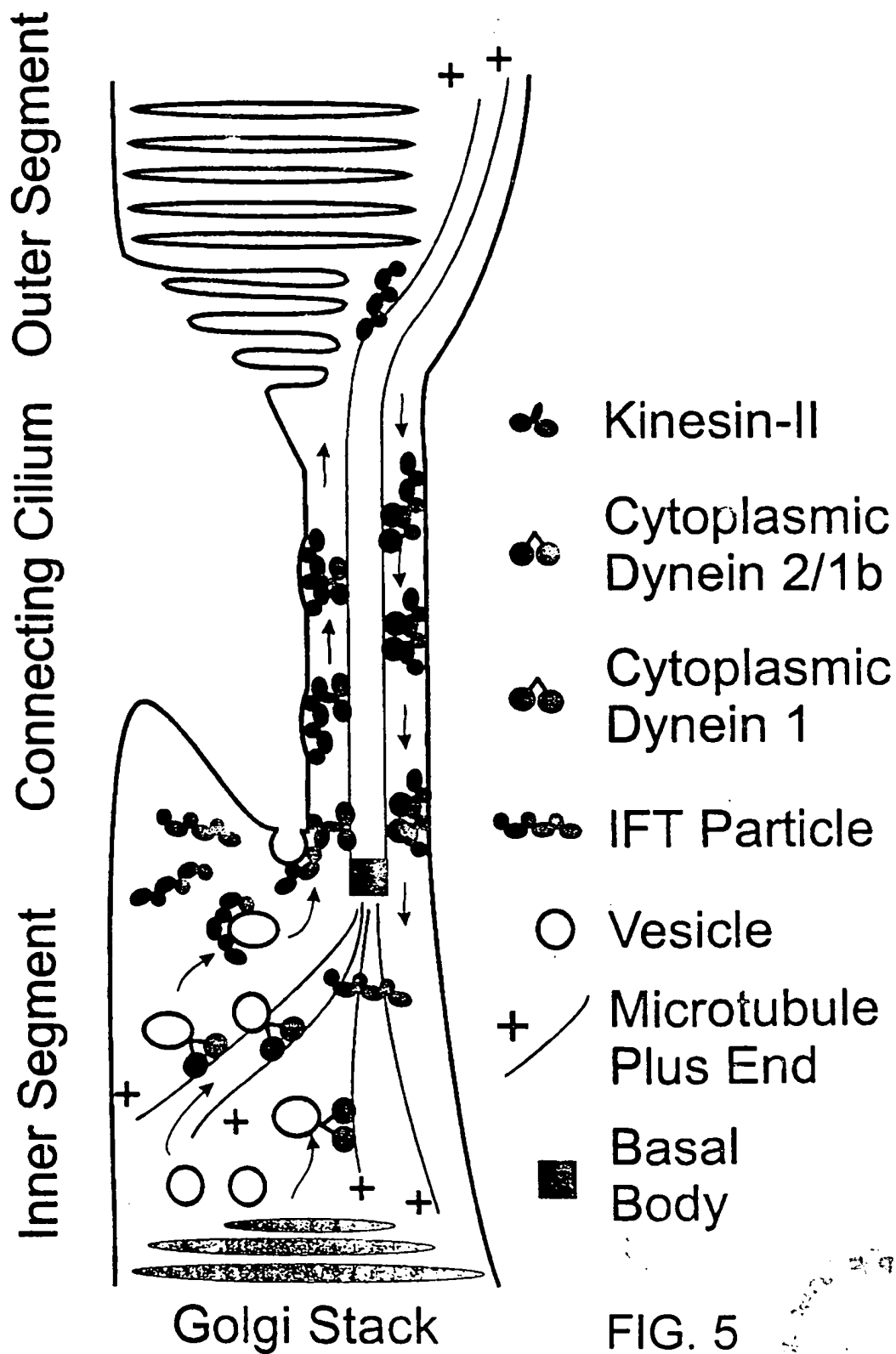


FIG. 5

IFT20

Chlamydomonas

>Cr_IFT20 predicted peptide

MDAVDRGVYFDEDFHVRILDVDKYNASKSLQDNTNVFINNIQNMQGLVDKYVSAIDQQVERLEA
EKLKAIGLRNRVAALSEERKRKQKEQERMLAEKQEELERLQMEEQLIKVKGEQELMIQKLSOSS
SGAAYV

(SEQ ID NO: 2)

FIG. 6A

>Cr_IFT20 cDNA

CACCGCTGCCGCTGAACAGAAAGTCTGCGCAGACTCGTCTTCTTGCCAAGTTCTTGCCAAAAC
CAGCAGGCCTAGAGGTTGCCTTAACCTAAATATACAAAACACAGAGCATCATGGACGCGGTA
GATAGAGGAGTCTACTTTGACGAGGACTTTCATGTCCGCATTCTTGATGTTGACAAGTACAAT
GCTTCAAAGTCGCTCCAGGACAACACAAATGTGTTTATTAAACAACATCCAAAATATGCAAGGC
CTCGTGGACAAGTACGTGTCCGCCATCGACCAGCAGGTCGAGCGGCTAGAAGCTGAAAAGCT
GAAGGCCATTGGCCTGCGGAACCGGGTGGCTGCGCTGAGCGAGGAGCGGAAACGTAAACAA
AAGGAGCAGGAGCGCATGCTAGCGGAGAAGCAGGAGGAGCTTGAAGAGGCTCCAAATGGAGG
AGCAGTCGCTGATCAAGGTGAAGGGCGAGCAGGAGCTCATGATTGAGAAGCTGTCGGACAGC
AGCAGCGGGGCGGCATACGTGTAAACGGTGTTCGGACGTATGCGTGCAAAGGTAGTTTGCT
CTGTGAGGGTTGGCTGAGGCGGCGGAGGCTGCTATTGAGGCTGCAGCATGCGGTCTGGTGGC
AGATGTACATAACGGTATGGGGTGTTCGGACAGAACGAAACGGCGAGGGTGGCGAAATGTC
GTGCAGAAGCGACGCTACAGCATCCATGGTACGTAGAGGCTTACTGGGTGTCAGTGCGTCGTC
CGCCACTGGGGACACACTTGCAGCGAGGAGCGCCATTGTTTGGCCCCACGGATTGCGTCAAGG
ACTTGAACGGCGCCAGTGAAGGCGGGGAATGGAATGTAAACAAACGACTCGAAAAAAAAAA
AAAAAAA

(SEQ ID NO: 1)

FIG. 6B

Human

>Hs_IFT20-1 chr17 gb|AC002094.1|AC002094 [expressed]

MAKDILGEAGLHFDENKLRVLDPEVTQQTIELKEECKDFVDKIGQFQKIVGGGLIELVDQ
LAKEAENEKMKAIKARNLLKSIKQREAAQQQLQALIAEKKMQLERYRVEYEALCKVEAE
QNEFIDQFIFQK

(SEQ ID NO: 23)

FIG. 6C

> Hs_IFT20-2 EST gb|AA584846.1|AA584846

QDSLGEAGLCFDELSKVRDPEVT*QTRDPKEDCMDVFGKISPFQKEIVGGGLIEPVDQLAKAAENEK
RKVVGAWNLLQFMAKHREAQQQQLLAQTAEKMWLKRWWIEYE

(SEQ ID NO: 24)

FIG. 6D

>Hs_IFT20-3 chr14 emb|AL121808.2|CNS01DSJ Human chromosome 14

MVKDILAEGLHFDENKLRVLDSEVTQQTIELKEECKNFADKTGQFQKTVGGGLIELVDK
LAKKA*NAKMRAMVLR

(SEQ ID NO: 25)

FIG. 6E

IFT27

Chlamydomonas

>Cr_IFT27 predicted peptide

MVKKEVKPIDITATLRCKVAVVGEATVGKSALISMFTSKGSKFLKDYAMTSG
VEVVVAPVTIPDTTVSVELFLDLAGSDLYKEQISQYWNGVYYAILVFDVSSMESFESCK
AWFELLKSARPDREPLRAVLVANKTDLPPQRHQVRLDMAQDWATTNTLDFFDV SANPPG
KDADAPFLSIATTFYRNYEDKVA AFQDACRNY (SEQ ID NO: 4)

FIG. 7A

>Cr_IFT27 cDNA sequence

ATGGTGAAGAAAGAAGTGAAGCCCATCGATATCACCGCAACGCTAAGATGCAAAGTAGCAGT
AGTCGGCGAAGCGACTGTCGGCAAGAGCGCGCTCATCTCTATGTTACGAGTAAAGGCAGCA
AGTTTCTAAAGGACTATGCGATGACGAGTGGGGTGGAGGTGGTGGTAGCCCCGGTGACCATT
CCGGACACGACGGTCTCGGTGGAGCTCTTTCTGCTGGACACGGCGGGGAGCGACCTGTACAA
GGAGCAGATATCGCAGTACTGGAACGGCGTATACTACGCCATTCTCGTGTTTCGATGTGAGCTC
TATGGAGTCCCTTCGAGTCGTGCAAGGCGTGGTTTGAGCTGCTCAAATCGGCGCGTCCCGACCG
CGAGCGGCCGCTGCGCGCCGTGCTGGTGGCGAACAAGACGGACCTTCCGCCGCAGCGGCACC
AGGTGCGGCTGGACATGGCGCAGGACTGGGCCACCACCAACACCCTCGACTTCTTCGACGTGT
CCGCGAACCCGCCCGGCAAGGACGCGGATGCGCCGTTCTGTCCATCGCCACCACCTTCTACC
GCAACTACGAGGACAAGGTGGCGGCCTTCCAGGACGCTTGCCGCAACTACTGA

(SEQ ID NO: 3)

FIG. 7B

Human

>Hs_IFT27 gi|12653581|gb|AAH00566.1|AAH00566 putative GTP-binding protein

MVKLA AKCILAGDPAVGKTALAQIFRSDGAHIFQKSYLT TGMDLVVKTVPVPTGDSVELFIFDS
AGKELFSEMLDKLWESPNVLCLVYDVTNEESFNNSKWLEKARSQAPGISLPGVLVGNKTDLAG
RRAVD SAEARAWALGQGLECFETSVKEMENFEAPFHCLAKQFHQLYREKVEVFRALA

(SEQ ID NO: 26)

FIG. 7C

IFT46

Chlamydomonas

>Cr_IFT46 predicted peptide sequence

MDDSM DY PDRD GDDL DQFQGTARSQVVQNQPHDEEVNLSESESFAGADE
PPAAPRDASLIESHDMDEGPAAPARTLSPTGYEAGKHAPGGIANSDEAPPGAYNAQEYKH
LNVGEDVRELFSYIGRYKPQTVELDTRIKPFIPDYIPAVGGIDEFIKVPRPDTKPDYLGL
KVLDEPAAKQSDPTVLTQLRQLSKEAPGAKADMVGRLEHTDENKAKKIQQWIASINDIH
KAKPAATVNYSKRMPEIEALMQEWPPEVETFLKTMHMPSGDVELDIKTYARLVCTLLDIP
VYDDPVESLHVLFTLYLEFKNNPIFRQHMENKLDGMSGGGGGMMGGGADVGL

FIG. 8A

(SEQ ID NO: 6)

>Cr_IFT46 cDNA sequence

ATGGATGACTCTATGGACTACCCTGACCGCGACGGGGACGACCTGGACCAGTTCCAGGGCAC
CGCGCGCTCGCAGGTCGTGCAGAACCAGCCGACGACGAGGAGGTGAACCTGAGTGAGTCGG
AGAGCTTCGCGGGAGCGGATGAGCCTCCAGCTGCGCCTAGAGATGCGTCGCTCATAGAGTCA
CACGACATGGACGAGGGGGCCAGCTGCTCCAGCGCGGACACTCTCACCAACGGGCTATGAGGC
TGGAAAGCACGCACCTGGCGGCATCGCCAACCTCGGACGAGGCACCGCCGGGTGCTTACAACG
CACAGGAGTACAAGCACCTGAACGTGGGCGAGGACGTGCGCGAGCTGTTCTCCTACATCGGC
CGCTACAAGCCGCAGACGGTGGAGCTGGACACGCGCATCAAGCCCTTCATCCCTGACTACATC
CCCGCGGTGGGCGGCATCGACGAGTTCATCAAGGTGCCGCGACCCGACACCAAGCCCGACTA
CCTGGGGCTCAAGGTTCTGGACGAGCCGGCCGCAAGCAGTCGGACCCACGGTGCTGACGC
TGCAGCTGCGGCAGCTGTCCAAGGAGGCGCCGGGCGCCAAGGCCGACATGGTGGGGCGGCTG
GAGCACACCGACGAGAACAAGGCCAAGAAGATCCAGCAGTGGATCGCCTCCATCAACGACAT
CCACAAGGCCAAGCCGCGCCGACCGTCAACTACAGCAAGCGCATGCCAGAGATCGAGGCGC
TGATGCAGGAGTGGCCGCGGAGGTGGAGACCTTCTCAAGACCATGCACATGCCGTCCGGC
GATGTGGAGCTGGACATCAAGACCTACGCCCCGCTGGTGTGCACGCTGCTGGACATTCCCGTG
TACGACGACCCCGTGGAGAGCCTGCACGTGCTGTTACACTGTACCTGGAGTTCAAGAACAAC
CCCATCTTCAGGCAGCACATGGAGATGGAGAACAAGCTGGACGGCATGTGGGCGGCGGCGG
CGGCATGATGGGCGGCGGCGCGGATGTGCTGGGCTTGTA

(SEQ ID NO: 5)

FIG. 8B

Human

>Hs_IFT46 [gi|8926685|emb|CAB96537.1| hypothetical protein [Homo sapiens]

MADNSSDECEEENNKEKKKTSQLTPQRGFSENEDDDDDDSSSETSDSDDDDEEHGAPLEGAY
DPADYEHLPVSAEIKELFQYISRYTPQLIDLHKLKPFIPDFIPAVGDIDAFKLVPRPDGKPDNLGLL
VLDEPSTKQSDPTVLSLWLTENSKQHNTQHMKVKSLEDAEKNPKAIDTWIESISELHRSKPPATV
HYTRPMPDIDTLMQEWSPEFEELLGKVS LPTAEIDCSLAEYIDMICAILDIPVYKSRIQSLHLLFSLYS
EFKNSQHFKALEGGKAFTPSSNSTSQAGDMETLTF

(SEQ ID NO: 27)

FIG. 8C

[illegible]

>Cr_IFT52 predicted peptide sequence

MEEPGAEVRLFSTAKGESHTHKAGFKQLFRRLRSTYRDPKVDKDDFTLDTLRSAILHLVLGGPKE
KFTAPEVDMKKFKVKNNGSILILMSEGGEKAGTNINYFLEQFGMSVNNDVAVRTTHYKYLHPKE
VLISDGILNRAVITGAGKSLNSNDDDEFVSRGPQAFDGTGLEYYVFPFGATLSVQKPAVPVLSSGKI
AYPMNRPVGAVWAQPGYGRIAVLGSCAMFDDKWLDKEENSKIMDFFFKFLEPHSKIQLNDIDAE
PDVSDLKLLPDTASLADKLKGCLQEIDDVPRDWTSLFDDSLFKFDTGLIPEAVSLYEKLGVKKGQL
NLIPPSFETPLPPLQPAVFPPTIREPPPALELFDLDESFASETNRLASLTNKHCHGEEDLEYIYIMEAGH
ILGLKLQENANAKHVLSEVFRRIAQYKMGSLGLGQTLDSMGQTLPAANQFGDQFEL

FIG. 9A

(SEQ ID NO: 8)

>*Chlamydomonas* cDNA sequence

CTAATGGCATGCAGTAAGGCACTGGTATAGAAACCGTTCCACCGCCGCGCCAGCCCCGCGT
CCTGTGAGCTGAGAGCTACTTAACAGCCATGGAGGAGCCGGGCGCGGAGGAGGTTCGGATTC
TCTTCAGCACAGCGAAGGGGGAATCCCATACGCACAAGGCAGGCTTCAAGCAGCTATTTGCA
CGATTGCGTTCAACTTATCGTCCAGACAAAGTAGATAAGGATGACTTCACGCTGGACACGCTG
CGGTCAGCGCACATCCTTGTGCTCGGTGGCCCGAAGGAGAAGTTCACCGCGCCTGAGGTGGA
CATGCTCAAAAAGTTCGTGAAGAATGGTGGCTCCATCCTCATTCTAATGTGCGGAGGGCGGCGA
GGAGAAGGCGGGCACTAACATCAACTACTTCCTCGAGCAGTTTGGCATGTGCGTGAACAACG
ACGCCGTGGTCCGCACCAACGCACTACAAGTACCTGCACCCCAAGGAGGTGCTCATCTCGGACG
GCATCCTCAACCGGGCGGTGATCACGGGCGCGGGGAAGTCGCTGAACAGCAACGACGACGAC
GAGTTCCGCGTGTGCGGGGGCGCGAGGCTTTTGTATGGCACGGGCTGGAGTACGTCTTCCCC
TTCGGTGCCACGCTCTCAGTGCAGAAGCCCGCGGTGCCCGTCTTGTCCAGCGGCAAAATCGCG
TACCCCATGAACCGGCCAGTGGGTGCGGTATGGGCGCAGCCCGGCTACGGCCGCATCGCCGT
GCTGGGCTCGTGCCCATGTTTGACGACAAGTGGCTGGACAAGGAGGAGAAGTCCAAAATCA
TGGACTTCTTCTCAAGTTCCTCGAGCCGCAITCCAAAATCCAAGTCAACGACATTGACGCGG
AGGAGCCGGACGTGAGCGACCTGAAGCTGCTGCCCGACACAGCCAGTCTGGCAGACAAGCTG
AAGGGCTGCCTCCAGGAGATCGACGACGTGCCGCGCGACTGGACCTCGCTGTTTCGACGACTC
GCTGTTCAAGTTCGACACCGGCCTCATCCCTGAGGCCGTGTCGCTGTACGAGAAGCTGGGCGT
GAAGAAGGGGCGAGCTGAACCTCATCCCGCCCTCCTTCGAGACGCCACTGCCGCGCTGCAGCC
CGCCGTGTTCCCGCCACCATCCGTGAGCCGCGCGCGCGCGCTGGAGCTGTTTCGACCTGGA
TGAGAGCTTTGCCAGCGAGACGAACCGGCTGGCCTCGCTACCAACAAGTGCCACGGCGAGG
AGGACCTGGAGTACTACATCATGGAGGCGGGCCACATCCTGGGCCTCAAGCTGCAGGAGAAC
GCCAACGCCAAGCACGTGCTGTGCGGAGGTGTTCCGCCGCATCGCGCAGTACAAGATGGGCAG
CCTGGGCCTGGGCCAGACGCTGGACTCCATGGGCCAGACCCTGCCCGCGGCCAACAGTTTCG
GCGACCAGTTCGAGCTGTAAGGAGCAGCGAGCTACAGGCCGAGCAACTGCGTGGCAGGCGGC
AGGGCGGGCGCTGGCTGCGGCGGAGGCCGAGGCGGGGGCGGCTGGCCTGGGAATGCTGCTGG
CAGCGGATGTGGAACGTGGGGCGCCGCGAGCTGCTGGAGCTGAGGCGGTTCGGGGCTGGCTG
CTGGCGTGTGTCAGCAGGATGTGCGCTTGTGCTGATGCGGTCAGCGGAGCAGCGGGCATGC
TGGGCTGCTGAACAGAGCCACGCGGGAGGGTGTGCGGCGCGCCAACGGCAGCAGCATGCTGC
ACGCGGGGTGTGGCCTGGCGGCGAAAAGCTGGGCATTACCGGTGCCTCCTCTGAAAGGCG
GCTGGGCTTGGCACCGCGTGTGCCGCTTGGCGTGTGCTGGGTGTAAGTGGTTTACGCGTTCTCC
AGTCTGATGAGAGGAGCCTTTATCGGATTGACAATGGTCCATGGTGAACGATGGATTATGGAT
ATCGGAGTGACAGAGGCTGACAAGATAACGTTACAGTCCAGGAGATATGTGGTGGTAGCTG
CAGCAACTACAAGATGGCGTCAGTCAGACCCGACCTGTTTTGAGTGCTGCAGGCTGACACGCA
TGCTGACAGAACAGACGCGCTGCAATTGCGGTTGATATTTTAGCCAGAAGGCAATATGTGGG
TGTATGCGGGGGGTGGCATGAGGCGCGGAGTGGAGGAGTACAGGGCTGCGTGGGCGTGGC
CGTCTGCGGTTGCAACAGTGAGCTGTGTTGGGTGTGCAAGGTGGTGGGCGTGTGCATGGAGCC
GTGTGGAGCAGTGTTCCTGTCGCTCAAGCGGCCAGCATTCACTAAGCTCACGTGTAAAC
TCATTGCGGCTGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

(SEQ ID NO: 7)

FIG. 9B

Human

>Hs_IFT52_gi|4929575|gb|AAD34048.1|AF151811_1 CGI-53 protein [Homo sapiens]
MEKELRSTILFNAYKKEIFTTNGYKSMQKKLRSNWKIQLKDEITSEKLNGVKLWITAGPREKFT
AAEFEILKKYLDTGDDVLVMLGEGGESRFDTNINFLLEEYGIMVNNDVVRNVYHKYFHPKEAL
VSSGVLNREISRAAGKAVLAIIDEESSGNNQAALTFVYPFGATLSVMKPAVAVLSTGSVCFPLNRPI
LAFYHSKNQGGKLAVLGSCHMFSDQYLDKEENSKIMDVVVFQWLTTGDIHLNQIDAEDPEISDY
MMLPYTATLSKRNRECLQESDEIPRDFTTLFDLSIFQLDTTSFHSHVIEAHEQLNVKHEPLQLIQPQFE
TPLPTLQPAVFPPSFRELPPPLELFDLDETFSSSEKARLAQITNKCTEEDLEFYVRKCGDILGVTSKLP
KDQQDAKHILEHVFFQVVEFKKLNQEHIDTSETAFQNNF (SEQ ID NO: 28)

FIG. 9C

Caenorhabditis elegans

>Ce_Osm-6_gi|2292823|emb|CAA03975.1|osm-6 [Caenorhabditis elegans]
MPPFSDEKMTNRSIGRKVLIDQSKQQISLISGFRGVARHLKSVLTVEINTEPINLNGLEDVRMLIIP
QPKTSFGTGEIEAIWKFEVGGSLMILSGEGGERQSLNEMIAKYGITVNKDSVIRTVFLKYFDPKEA
LVANGVINRAIAVAACKNVSTEQKHNSQALSFIYPYGCTLDVNNRMSNVVLSSGSTSFPTSRPVAA
FHETKLNEMKKKGRVCVVGSVSMFHDTYIDKEENGKIFDTFVEFLVNGLELNTIDAAEPEINDYTN
IPDHIHMSQQIKVCMYEGELDQAISDFMKIMDTLSHSFNLKHWPMTIRLYEALNLSPPPLTLVEPQ
FELPMPPFQPAVFPPTFQELPMPPLELFDLDEQFSSPEIQLSQLANRSEEDLIFFIEKAGEITGISAEL
TRSERTPKKIIELAVSKLMLFKRSMMDGELEVASAFDIGEHDAHHQSFNQGEEMDEQLFSDIDEFD
DL (SEQ ID NO: 29)

FIG. 9D

IFT57

Chlamydomonas

>Cr_IFT57 predicted peptide sequence

MSSKRGRSSLAKAPEEAVNGEAFAPESP PPPGDDGDAGGEDGGAPAPPPPPATKGGPVAVGRS
LEIQTTPDVCMEMLADKLKLLNYEADFCRKKKPYRKPLSRLYFAVPLANSSEQFFYFTSLATWLL
GLAGVELPAPKEFDDPNLTCQNILGAVKKLGFAPPSYHPTKLTVGNGKEVVGVLDGLVDFVLERR
HHKYSRPAYGNDGQPEEGVQLDDEAEAAAMEGADELAMPAQNQADDDEEEEGVYVDPGRGDA
AGPGTGASAAMDAEKAVLVSKVDPTLWKIELERVAPKLRTIAADSKDWRSHLDEAHQHKEVISK
AWPDSKTSLERLRADLNGTLEKLQTREKFLNEQFESLMQQYRAARTTFTDVQETYNRKTEAVAD
RNQEMHRIGETLEEVKAMMDEKGSNIADATPVARIKTAIKQLNKELHDMEVRIQVVSHTLLQLSL
RNKRLQLQAALSDEEED (SEQ ID NO: 10)

FIG. 10A

>Cr_IFT57 cDNA sequence

GTCTTGGGAACCCAGCGAGCCGCGCTCCTTGCCACATGTCCTGCTAGCTTCTGGTTTACACCGT
AGATTCATTTAAGCGAGAGACATGAGCAGCAAGCGGGGTGGGCGGTCATCCTTAGCAAAGGC
GCCCCAAGAGGCGGTAAATGGCGAGGCATTTGCGCCTGAGGCATCTCCCCCTCCACCCGGCG
ACGATGGAGATGCTGGTGGGGAGGACGGTGGCGCGCCTGCGCCCCCTCCGCCCCCGGCTACA
AAGGGCGGTCCAGTAGCTGTAGGAAGGTCGCTGGAGATACAAACAACGCCGGACGTGTGCAT
GGAAATGCTGGCCGACAAGCTGAAGCTGCTAACTACGAGGCGGATTTCTGCAGGAAGAAGA
AGCCCTACCGGAAACCCCTCTCGCGGCTCTATTTTGGCGGTGCCGCTCGCAAACCTCGAGCGAGC
AGTTCTTCTACTTTACCAGTCTGGCGACCTGGCTGCTGGGCGTGGCTGGCGTGGAGCTGCCCG
CTCCCAAGGAGTTTGATGACCCGAACCTTGACGTGCCAGAACATCCTGGGTGCGGTGAAGAAG
CTGGGCTTTGCGCCGCCAGCTACCACCCTACCAAGCTCACAGTGGGCAACGGCAAGGAGGT
GGTGGGTGTGCTGGACGGGCTGGTGGACTTCGTGCTGGAGCGCGCGGCAACCACAAGTACAGCC
GGCCCGCGTACGGAAATGATGGGCAACCGGAGGAGGGCGTGCAACTGGACGATGAGGCGGA
GGCTGCCGCGATGGAGGGTGGCGATGAGCTGGCGATGCCAGCCCAGAACCAGGCGGATGACG
ATGAGGAGGAGGAGGGCGTATACGTGGACCCGGGGCGCGGTGACGCCGCGGGGCCAGGGAC
AGGGGCATCCGCGCGATGGACGCGGAGAAGGCGGTGCTTGTGTCCAAGGTGGACCCACGC
TCTGGAAGATCGAGCTGGAGCGCGTGGCGCCGAAGCTGCGTATCACCATCGCCGCCGACTCG
AAGGACTGGCGCTCACATCTGGATGAGGCGCACCAAGGAGGTGATCAGCAAGGCCTG
GCCCCACAGCAAGACGTCGCTGGAGCGCCTGCGTGCGGACCTGAACGGCACGCTGGAGAAGC
TGCAGACGCGTGAGAAGTTCTCAACGAGCAGTTTGAGAGCCTCATGCAGCAGTACCGCGCC
GCCCCGACCACGTTACGGACGTGCAGGAGACATACAACCGCAAGACGGAGGCGGTGGCGGA
CCGGAACCAGGAGATGCACCGCATCGGCGAGACGCTGGAGGAGGTGAAGGCCATGATGGAC
GAGAAGGGCAGCAACATCGCGGACGCCACGCCTGTGGCTCGCATCAAGACCGCCATCAAGCA
GCTTAACAAGGAGCTGCACGACATGGAGGTGCGCATCGGCGTGGTTAGCCACACGCTGCTGC
AGCTATCGCTGCGCAACAAGCGATTGCTGCAGGCGCAGGCGGCTCTCAGTGACGAGGAGGAG
GACTAGCTAGATCAGCGAGTGACAGAGGGCATGTGTGCGTACCGTGTGCGCGGGTACAGCCG
TGGGATGGAAGAGGTGATGTGGCGGGTTGCGGACCCAGCATTCCGTAGACCAGATCACTTAT
AGGTACAGAAAGACGGCTATATTGTTGGGGGCGGCGCACCCCTGGCTATGTATATACAAGCCG
TAGCGCAGAGCCGCTGCAAATGCGGTGCTGTGCTGCTCCCGTGGGTGTGCGGCGTTCGGG
TCAAGTTCATATAAGCTGTTGTGACTTGTGAGGCAGGCATGGCATATGGACAGGGCATCCCTG
CAAGGAAAGCAGGCAGCGGTATCCTTGTGGCGATGGGTCAAGCAGTGATGGAGGGGCGAAGC
GAGTTGCGGGCCTGTAAGCACAGGGTTGCCAAAAA (SEQ ID NO: 9)

FIG. 10B

Mouse

>Mm_IFT57 predicted peptide sequence

MAAAAAVIPPSGLDDGVSRARGEGAGEAVVERGPGAAHYMFVVMEDLVEKLKLLRYEEELLRK
SNLKPPSRHYFALPTNPGEQFYMFCTLAAWLINKTGRAFEQPQEYDDPNATISNILSELRSFGRAD
FPPSKLKSGYGEQVCYVLDCLAEELKYIGFTWKRPSYPVEELEEEETVPEDDAELTSLKVDEEFVE
EETDNEENFIDLNVLKAQTYRLDTNESAKQEDILESTTDAEWSLEVERVLPQLKVTIRTDNKDW
RIHVDQMHQHKSGIESALKETKGFLLKLNHNEISRTLEKIGSREKYINNQLHLVQEYRGAQAQLSE
ARERYQQGNGGVTERTRLLSEVTEELEKVKQEMEEKSSMTDGTPLVKIKQSLTKLKQETVQMDI
RIGVVEHTLLQSKLKEKCNMTRDMHAAVTPESAIGFY (SEQ ID NO: 12)

FIG. 10C

>MmIFT57 cDNA sequence

GCGAAGGCTGCAGAGATCCTGGCCGGAGCCCAGCCGGGCGCTGGGGG
TCTGAGCAGGGATGGCCCGCCGCGCGGTGATCCCGCCGCTGGACGATGGGGTG
TCTCGGGCTCGCGGGGAAGGCGCAGGGGAGGCTGTGGTGGAGCGCGGGCCAGGAGCGGCCTA
CCACATGTTTCGTGGTGATGGAAGACTTAGTGGAGAAGCTGAAGCTGCTCCGCTACGAGGAGG
AGCTACTCCGAAAGAGCAATCTGAAGCCCCCGTCCAGACACTACTTTGCTCTGCCTACCAACC
CAGGCGAGCAGTTCTACATGTTTTGCACTCTTGCTGCGTGGCTGATCAACAAAAGTGGCCGTG
CCTTTGAGCAGCCTCAAGAATACGACGATCCCAATGCAACTATATCTAATACTCTCTGAGC
TTCGCTCTTTTGGGAGAACTGCAGATTTTCTCCTTCAAAATTAAAGTCTGGTTACGGAGAACA
AGTGTGCTATGTTCTTGATTGCTTAGCTGAAGAAGCTTTAAATATATTGGTTTCACTTGGA
AGGCCATCATACCCAGTGAAGAAGTGAAGAAGAACTGTTCCAGAAGATGATGCCGAGTT
AACATTAAGTAAAGTGGATGAAGAATTTGTGGAAGAGGAGACAGATAATGAAGAAAACCTTA
TTGATCTCAACGTTTTAAAGGCCAGACCTATCGCTTGGACACAAACGAGTCTGCCAAACAAG
AAGATATTTTGAATCTACGACAGATGCTGCGGAATGGAGCCTAGAAGTTGAGCGTGACTAC
CGCAGCTGAAAGTCACGATTAGGACTGACAATAAGGATTGGAGGATCCATGTTGACCAAATG
CACCAGCACAAAAGTGGGATTGAATCTGCTCTGAAGGAGACCAAGGGGTTTTTGGACAAGCT
CCATAATGAAATTAGCAGGACTCTGGAAAAGATTGGCAGCCGAGAAAAGTACATTAACAATC
AACTTGAGCACTTGGTTCAAGAATATCGTGGGGCCCAAGCCCAGCTAAGTGAGGCAAGGGAG
CGCTACCAGCAGGGCAATGGCGGAGTAAGTGAACGGACCAGACTCCTCTCTGAGGTTACAGA
AGAATTAGAAAAGGTAAAGCAAGAAATGGAAGAGAAGGGCAGCAGCATGACGGACGGCACT
CCTTTGGTGAAGATTAAGCAGAGCTTAACCAAGCTGAAGCAAGAACTGTTTCAGATGGACAT
TAGAATCGGTGTGGTGGAGCACACGCTACTTCAGTCAAAACTCAAGGAGAAGTGCAACATGA
CCAGGGACATGCATGCAGCTGTCACCCAGAGTCAGCAATTGGCTTCTATTAAACACGTGGGC
TTCCATGCTTCTGATTATTTCTGTTTTATATCAAATGATTTTTTAATGTTGCATTGATTTCCAA
CACAATTTATACTTCTTCAAGCATATTCAGTGGGTATTTTGCACATGTGTTAATATCATGGTG
ATTATGATGGCCAAAGCCTGTACAATGAATATAGTATTTAATAAAGTACTTAAATTAATAA
AAAAAAAAA (SEQ ID NO: 11)

FIG. 10D

Human

>Hs_IFT57-1 gi|7022022|dbj|BAA91466.1| unnamed protein product [Homo sapiens]
MTAALAVVTTSGLEDGVPRSRGEGTGEVVLERGPGAAHYMFVVMEDLVEKLKLLRYEEFLRKS
NLKAPSRHYFALPTNPGEQFYMFACTLAAWLINKAGRPFEQPQEYDDPNATISNISELRSFGRTADF
PPSKLKSGYGEHVCYVLDCAEEALKYIGFTWKRPIYPVEELEEESVAEDDAELTNKVDEEFVEE
ETDNEENFIDLNVLKAQTYHLDMNETAKQEDILESTTDAAEWSLEVERVLPQLKVTIRTDNKDWR
IHVDQMHQHRSGIESALKETKGFLDKLHNEITRTLEKISSREKYINNQLLENLVQEYRAAQAQLSEA
KERYQQGNGGVTERTRLLSEVMEELEKVKQEMEEKGSSMTDGAPLVKIKQSLTKLKQETVEMDI
RIGIVEHTLLQSKLKEKSNMTRNMHATVIPEPATGFY (SEQ ID NO: 30)

FIG. 10E

>Hs_IFT57-2 chromosome 12 [ESTS BF089172]
DQRIHVDQMYQHKSGIESSLKESKRFFDKLHNE
ISKTEKISHCEKYINHQLHRVQEYPAAQTQLSDVRSQQGSGGVIERTRLLSEATED
TEHVKLEMEEEKCSSMTDGDSLVIKQSLTKLKQETVQMDIRIGVVEHTLL (SEQ ID NO: 31)

FIG. 10F

Caenorhabditis elegans

>Ce_IFT57 gi|7504754|pir|T22994 hypothetical protein F59C6.9 - Caenorhabditis elegans
MLHHIKSLKSVLSRGQEGRFGEKRHSNTTFTGIATDFTAALKKSGAGENVIFILNSLADASLVHVG
FQWQKMIPPKEEDEDTAVIDEQDEDDDDNDIVEEPMNFLDDDDDDNVIEIDLKAQGLATESKNPLQ
SVLQSNTDAITWKQEVERVAPQLKITLKQDAKDWRLHLEQMNSMHKNVEQKVGNGVGPYLDNMS
KDIKALERIASREKSLNSQLASMMSKFRRATDTRAELREKYKAASVGVSSRTETLDRISDDIEQL
KQIEEQGAKSSDGAPLVKIKQAVSKLEEELQTMNVQIGVFEQSILNTYLRDHFNFSAANLLNIM

(SEQ ID NO: 32)

FIG. 10G

FIG. 10E

IFT72

Chlamydomonas

>Cr_IFT72 partial predicted peptide sequence (lacking N-terminal end)

VYVVIQEF AALKDRNEQQRKRVDEV LTERLNLESKAKQAESK
MSEIQASMDQRLNSMPPSQRNEYTTLVAEQQLQADSKRFEEVLDEL DKALQASEGELAR
NPFKQ RSLQLQE QIRALTGKKYELTEEERQSKRSPEELRADLMAKIKRDNTEVEQMTQQI
RELQDQIKKMEERVKSLGGATSGAVAAEEKANREKFEELLAKERHLNNFMDGFPSRKA
AQKMEKQKEDGIVGVLEK MVKMQGIIGSNLPSQKKYKEMQDELEYKKMQLENTQTTQERLK
EELTMRRTELEKIDTLEDKIKLELTQLAERQEAMEKEMGEFGSVEDIQRKANAARERMGA
CAVCCLKRKDLLRSIVAERGLKFQAKRAQLQDHNLQVQLEKMEAKLNLSAGVFEMDEFI
KAKESETNYRQLASNIAALVDDLNVHVKKAVV (SEQ ID NO: 14)

FIG. 11A

>Cr_IFT72 partial Cdna sequence (lacking 5' end)

GTGTACGTGATCCAGCAGGAGTTCGCGGCGCTCAAGGACCGCAACGAGCAGCAGCGCAAGCG
CGTGGACGAGGTGCTCACGGAGCGCCTCAACCTCGAGTCCAAGGCCAAGCAGGCCGAGTCCA
AGATGTCTGAGATCCAGGCGTCCATGGACCAGCGCCTCAACTCTATGCCGCCAGCCAGCGCA
ACGAATACACCACGCTCGTGGCCGAGCAGCAGCAGCTGCAGGCCGACAGCAAGCGCTTTGAG
GAGGTGCTGGACGAGCTGGACAAGGCGCTGCAGGCCAGCGAGGGCGAGCTGGCGCGCAACC
CCTTCAAGCAGCGCAGCCTGCAGCTGCAGGAGCAGATCCGCGCGCTCACGGGGAAGAAGTAC
GAGCTGACGGAGGAGGAGCGGCAGAGCAAGCGCTCGCCGAGGAGCTGCGCGCCGACCTCAT
GGCCAAGATCAAGCGAGACAACACCGAGGTGGAGCAGATGACGCAGCAGATCCGCGAGCTTC
AGGACCAGATCAAGAAGATGGAGGAGCGCGTCAAGAGCCTGGGCGGCGCCACAGCGGCGC
GGTGGCGGCGGAGGAAAAGGCCAACCGCGAGAAGTTTGAGGAGCTGTTGGCCAAGGAGCGC
CACCTAAACAACCTTTATGGACGGCTTCCCCAGCCGCAAGGCCGCAAGATGCAGGAGAAGCA
GCAGAAGGAGGACGGCATCGTGGGCGTGCTGGAGAAGATGGTGAAGATGCAGGGCATCATTTG
GCTCCAACCTGCCAGCCAGAAGAAGTACAAGGAAATGCAGGACGAGCTCGAGTACAAGAA
GATGCAGCTGGAGAACACGCAGACCACGCAGGAGCGGCTCAAGGAGGAGCTGACCATGCGG
CGCACAGAGCTGGAGAAGATCGATACGCTGGAGGACAAGATCAAGCTGGAGCTGACGCAGCT
GGCGGAGCGGCAGGAGGCCATGGAGAAGGAGATGGGCGAGTTCGGCAGCGTCGAGGACATC
CAGCGCAAGGCCAACGCCGCACGCGAGCGCATGGGGGCTGCGCAGTGTGCTGTTTGAAGCG
CAAGGACCTGCTGCGCTCCATCGTGGCGGAGCGCGGCTCAAGTTCAGGCCAAGCGCGCGC
AGCTGCAGGACCACAACCTCCAGGTGCAGCTGGAGAAGATGGAGGCCAAGCTGAAGAATCTG
AGCGCGGGCGTATTCGAGATGGACGAGTTCATCAAGGCCAAGGAGAGCGAGACCAACTACCG
CCAGCTGGCCTCCAACATAGCGGCGCTGGTAGACGACCTCAACGTGCATGTCAAGAAGGCCG
TGGTGTAAAGAAGGAGGCAGTGGTGTAAAGGGTCTCCGGAGGAGGGCGCGTGCCGTTGTTGGG
GTGTTGGGGGCGCGGCGGAGAAAGTACGTGCGTGTGGCGTTGTGCCTTTACAGAGGCTGCACG
TGATGTACGGTAGTCAAGGTGAAGGGCGGCTGGGCACAGGAGGATGCTGACGCCGTGACGG
GTGACGATGACAGGCCATCGCGAGTTTGATCTCTGCTGTCGAGTCATTGACTTGGGTTTCCTAG
ACAGGTCGGGCTACAAGCCCGAGGTTGATGGCTCACCTCGCAGTGCAGCGGACAGCAGGTGT
GGCGCATGCGCATGTGCTCAGGAGCGCGGTGCGGACCAAGGAAGATGCGATGGGAGTAGGC
TAGGCCTGTGTGAGGGCCCTTGCCGAAGCGCCACGGCCATTCCATGGCCTGGCCGAAGGCA
GCGCTCGTGGTTGGATACTGACCAGCGGCGTCAAGCGGCGTACGATGTCAGAAGTGGAGCTA
CCGCCCTGCACAAGGGGTGATGTACATACTGTTATTTAGGAGTCCGCTGCTTATAGCTACTG
GACTGCAGAAGAAGGAGGCTGCAAGGATCTGATGGAGGCGCTGGTGTGTATGGATGACGCTG
TAAGAGATGCACAAGAGAAAAA

(SEQ ID NO: 13)

FIG. 11B

Human

>Hs_IFT72 gi|13376669|ref|NP_079379.1| hypothetical protein FLJ22621
MEEVMNGYNMLKAQNDRETQSLDVIFTERQAKEKQIRSVEEEIEQEKQATDDIIKNMSLENQVKY
LEMKTTNEKLLQELDTLQQQLDSQNMKKESLEAEIAHSQVKQEAVLLHEKLYELESHRDQMIAED
KSIGSPMEEREKLLKQIKDDNQEIASMERQLTDTKEKINQFIEEIRQLDMDLEE HQGEMNQKYKEL
KKREEHMDTFIETFEETKNQELKRKAQIEANIVALLEHCSRININRIEQISSITNQELKMMQDDL NFK
STEVQKSQSTAQNLTSDIQLQLDLQKMELLESKMTEEQHSLSKSIKQMTTDL EINYNDLPALKSSG
EEKIKKLHQERMILSTHRNAFKKIMEKQNIYEALKTQLQENETHSQLTNLERKWQHLEQNNFAM
KEFIATKSQESDYQPIKKNVTKQIAEYNKTIVDALHSTSGN (SEQ ID NO: 33)

FIG. 11C

099659-4004



IFT88

Chlamydomonas

>Cr_IFT88 predicted peptide

MSYGGTEEDDLYGGYDEQSNPLAGSGGAAFKALGADGAPPGTAMMGPPGTAMKSFVPGTA
MRGGTAMQQDPSLARPMTSNRGAGFTSAPNKKFDPLNRSMSGSTLGSSGGGAMLVARKGDT
SPEEQARGMEKTVHELLEKSAADAANKNDINSALENAMKNERKLCRFREQNNMADQIN
LELMYAVDFNLAHMYHMKNKYSEALNLYTAIVRNKNFPQSGWLRVNMGNIHFEQKKYPSA
IKMYRMALDQISATAKEVRFKIMRNIGLSFVRMGQYPDALQSFATVMDNVPDHQTGYNLV
MCNYALSDREGMKNAFIKLLKVSPSEMDDDDDDDDPMGDDDMQVMTMDDGLKDEMRRNT
IITRLIVKAAQLISEKVDRANGFEGGFMWCCEQLRDAGYTKLANEVELAKATRFMGQKQF
DKAVGVFKDFEKKEPRVKARAATNLAFLYFLEGETDQADKYSEMALKSDRYNARAYVNKG
CVLVERGDLEGARSLFNEAAGIDPYCVEAIYNLGLVSQRLNELPYALAAFKKLHNMVPDN
VEVIHQIATTYDMMGDFKNAVKWFELLTSLVSNDPGVLARLGAIHARFDDEAKALHYYQE
SHRVYPVNMDVISWLGAYHVKSEVYEKAMPFFDLASKIQPQEVKWALMVASCYRRTNNLP
AALGKYKQIHTQHPDNVECLRYLVHLCSELGRRAEAAEYMTKLKKAEEAAVPEATTAAAP
AAAAAGSGMGGMGGLDDDIGSSAVSAQNRGKKMLVKEHMGGGGGKDNDWDGNEQLGDDLL
PM (SEQ ID NO: 16)

FIG. 12A

FIG. 12A

Humans

>gi|5729800|ref|NP_006522.1| Tg737 protein: Probe hTg737 (polycystic kidney disease)
MMQNVHLAPETDEDDLYSGYNDYNPIYDIEELENDAAFAQAVRTSHGRPPITAKISSTAVTRPIA
TGYGSKTSLASSIGRPMTGAIQDGVTRPMTAVRAAGFTKAALRGSAFDPLSQSRGPASPLEAKKK
DSPEEKIKQLEKEVNELVEESCIANSCGDLKLALAKADAGRKERVLRQREQVTTPENINLDLTY
SVLSNLASQYSVNEMYAEALNTYQVIVKNKMFSNAGILKMNMGNILKQRNYSKAIKFYRMALD
QVPSVKNQMRIKIMQNIGVTFIQAGQYSDAINSIEHIMSMAPNLKAGYNLTICYFAIGDREKMKK
AFQKLITVPLEIDEDKYISPSDDPHTNLVTEAIKNDHLRQMERERKAMAEKYITTSAKLIAPVIETSF
AAGCDWCVEVVKASQYVELANDLEINKAVTYLRQKDYNQAVEILKVLEKKDNRVKSAAATNLS
ALYYMGKDFQAQASSYADIAVNSDRYNPAALTNGNTVFANGDYEKAAEFYKEALRNDSSCTEAL
YNIGLTYEKLNRLEALDCFLKLHAILRNSAEVLYQIANIYELMENPSQAIEWLMQVVSPIPTDPQ
VLSKLGELYDREGDKSQAFQYYYESYRYFPCNIEVIEWLGAYYIDTQFWEKAIQYFERASLIQPTQ
VKWQLMVASCFRRSGNYQKALDITYKDTHRKFPENVECLRFLVRLCTDLGLKDAQEYARKLRL
EKMKEIREQRIKSGRDGSGGSRGKREGSASGDSGQNYSSASKGERLSARLRALPGTNEPYESSNK
EIDASYVDPLGPQIERPKTAAKKRIDEDDFADEELGDDLLPE (SEQ ID NO: 34)

FIG. 12C

Caenorhabditis elegans

>Ce_Osm-5 gi|12659061|gb|AAK01173.1|AF314195_1 OSM-5 [Caenorhabditis elegans]
MANSTFREDDDDFYGGFDSYDKAYDIQNITQNPQFQQAVARSSHGRRPPTASQMGRDASSSYGKP
PGTMMGNQSRMGGRRTAMANNNEPARPMTAVRGAGYTSFANKVQAAERPLSTENSGENGEEKCR
QMENKVMEMLRSLASEKKKFKEALDKAKEAGRREAVVKHREQQGLVEMMNLDLTFTVLF
NLAQQYEANDMTNEALNTYEIIVRNKMFPNSGRLKVNIGNIHFRKREFTKALKYYRMALDQVPSI
QKDTRIKILNNIGVTFVRMGSYDDAISTFDHCVEENPNFITALNLILVAFCIQDAEKMREAFVKMIDI
PGFPDDDYMKEDDDDDVLLNQTLSNDMLKNWEKRNKSDAEKAIITAVKIISPIAPDYAIGYEW
LESLKQSVHAPLAIELEMTKAGELMKNGDIEGAIEVLKVFNSSQDSKTASAAANNLCMLRFLQGG
RLVDAQQYADQALSIDRYNAHAQVNQGNIAYMNGDLDKALNNYREALNNDASCVQALFNIGLT
AKAQGNLEQALEFFYKLHGILLNNVQVLVQLASIESLEDSQAIELYSQANSVLPNDPAILSKLA
DLYDQEGDKSQAFQCHYDSYRYFPSNLETVEWLASYYLETQFSEKSINYLEKAALMQPNVSKWQ
MMIASCLRRTGNYQRAFELYRQIHRKFPQDLCLKFLVRIAGDLGMTEYKEYKDKLEKAEKINQL
RLQRESRSSQGRHSANSTHSLPPSGLTGLGSGSGGSGGGTRQYSAHVPLLLDSGTPPTVAQRDM
KAEDFSYDDPVAISSRPKTGTRKTTTDTNIDDFGDFDSSLPLD (SEQ ID NO: 35)

FIG. 12D

IFT122

Chlamydomonas

>Cr_IFT122 partial predicted peptide sequence (lacking N-terminal end)

HEGHFRRAPHFAYAKETLLKMDDTKGLITLYVEAEKWDDAFLLLHAHPECRQDVYLPYAKWLSN
QDRFDEARLAYQEGGFPSLATRILEQLCANAVVETRYADAAFYYYQLAMEALKSIKNPPSNMAPS
DRSALERFTELYDRAEVYYAYEVVHKSVHSPFRTHPTDLFNASRFLLMRLLPREVPLGVSVVN
VVYVLAKQAVEAGAFKLARFAYNKLQTLVLPAAWQAEVDLASVVIRSKPFSDELLPVCWRCS
TTNPLLNTQGDYCINCGAPFIRSFVTFEHLPPVEFELEPGVDDEEAGRLLGEDAGMEAARRERKAE
RQAKAAEVGGNMLRLDQNEIDRMDDAFAAQMMVPNTTIRVDRAMLRRLKTAEMVVRTWPNPV
IPKQYFRSHGPGGA AVLQDPADTSSSRMSSRWRRWSVARRPSAAPPCAARAWRRARTPRMRVPA
ATSWAGRWAARVGLGAPARRACPCPSSRAGRWCERGLSGAYRVRGWIPDVGGE

(SEQ ID NO: 18)

FIG. 13A

>Cr_IFT122 partial cDNA sequence (lacking 5' end)

GGCACGAGGGCCACTTCCGCCGCGCGCCGCACTTTGCGTACGCCAAGGAGACGCTGCTCAAA
ATGGACGACACCAAGGGCCTGATCACGCTGTACGTGGAGGCTGAGAAGTGGGATGACGCCTT
CCTGCTGCTGCACGCGCACCCCGAGTGCCGGCAGGACGTGTACCTGCCCTACGCCAAGTGGCT
CAGCAACCAGGACCGCTTCGATGAGGCGCGGCTGGCGTACCAGGAGGGCGGCTTTCCCGCC
TGGCCACCCGCATCCTGGAGCAGTTGTGCGCCAACGCGGTGGTAGAGACGCGTACGCGGAC
GCCGCTTCTACTACTATCAGCTGGCCATGGAGGCGCTCAAGAGCATCAAGAACC CGCCCTCC
AACATGGCGCCCTCGGACCGCTCCGCGCTGGAGCGCTTCACGGAGCTGTACGACCGCGCCGA
GGTGTACTACGCCTACGAAGTGGTGCAACGTCCGTGCACTCGCCCTTCCGCACCACGCACCC
CGACACGCTCTTCAACGCCTCGCGTCTCCTGCTCATGCGCCTGCTGCCGCCGCGCGAGGTGCC
GCTGGGCGTCAGCGTGGTCAACGCTTCCGTGCTCATGCGCCTGCTGCCGCCGCGCGAGGTGCC
CCTTCAAGCTGGCGCGCTTCGCGTACAACAAGCTGCAGACGCTGGTGTGCGCGCGGCGCTGGC
AGCGGAGGTGGACCTGGCATCCGTGGTTCATCCGCTCCAAGCCTTCTCAGACAAGGAGGAC
CTGCTACCGGTGTGCTGGCGCTGCTCCACCACCAACCCGCTGCTCAACACGCAGGGCGACTAC
TGCATCAACTGCGGCGCGCCCTTCATCCGCTCCTTCGTACCTTCGAGCACCTGCCC GTGGTGG
AGTTTGAGCTGGAGCCGGGCGTGGACGACGAGGAGGCGGGCCGCTGCTGGGCGAGGACGCG
GGCATGGAGGCGGCGCGGCGGAGCGCAAGGCGGAGCGGCAGGCCAAGGCGGCGGAGGTGG
GCGGCAACATGCTGCGGCTGGACCAGAACGAGATCGACCGCATGGACGACGCCTTCGCGGCC
CAGATGATGGTGGCCAACACCACCATCCGCGTGGACCGGGCCATGCTGCGGCGGCTCAAGAC
GGCCGAGGTGATGGTGCACCTGGCCCAACCCCGTCATCCCCAAGCAGTACTTCCGCAGTCA
TGGACCAGGAGGTGCCGCTGTGCTGCAGGACCCTGCGGACACTTCTTCGAGCAGGATGAGTTG
GAGATGGCGGCGCTGGAGCGTGGACGCGGCCCTTCAGCCGCACCACCGTGCGCGGCGAGGG
CCTGGCGCCGGGCGAGGACGCCGAGGATGAGGGTGCCGGCGGCAACAAGCTGGGCGGGCCG
TTGGGCAGCGCGCGTGGGCCCATTTGGGGCGCCAGCAAGGCGCGCATGTCCGTGCCCTTCCA
GCAGGGCCGGCGCTGGTGTGAGCGGGGTGCGCTATCGGGCGCTTACCGGGTGGTGGTGG
ATTCCGGATGTAGGCGGGGAATAGGAGCTGCCCGTAGTGGCGTTGCAGCAGGCCTTCGTTAC
GCAGCAGAGGGGGCACGAGGAGGACGTGAACGGGTGTCTTCATGCTGCTTGTGGTCTGACTT
GGTAGGACGGGCGTTGGTGCCATCATTAGGCTGCCCTGCCGGTCCACCATAGGAGCTGCGAT
GGGCCTGAAGCAAGGCCCATGCACGGTGGCCGGGCACATGATGCATGACGGGACAGAGCAGG
GGACTTGCTGGAACCAAGTGTACATATGCCCCGCGCAGAGACTGCGTGTCTCGAAGCGGGCAC
AATTGGGACATGTGCGCGTACAGACAAACGATGATGATGACAGGATGACAGTTGTTGTGCGG
CAGGGGGGCTCCCAAGCCCAGTTGAGGCCAGGCAGGTTTGGTTGAATGGGGATGCACAGTG
GCAGTGCTAATGCGCTGGCGCTATGAGCGTCCATGGTGTGGCGGCGCTCAAGTACAAGACACC
TTATAGTAGTTCAATCTGCCCCGCAAAAAAAAAAAAAAAAAAAAAA

(SEQ ID NO: 17)

FIG. 13B

Human

>gi|11360072|pir|T43484 hypothetical protein DKFZp434K016.1 - human (fragment)
TLLQPLKGHKDTVYCVAYAKDGKRFASGSADKSVIIWTSKLEGILKYTHNDAIQCVSYNPITHQLA
SCSSSDFGLWSPEQKSVSKHKSSSKIICCSWTNDGQYLALGMFNIGIIRNKNGEEKVKIERPGGSLS
PIWSICWNPSSRWESFWMNRENEDAEDVIVNRYIQEIPSTLKSAYVSSQGSEAESEEEEDDSPRD
DNLEERNLILAVADWGQKVSYFQSLGKQIGKDRALNFDPCISYFTKGEYILLGGSDKQVSLFTKD
GVRLGTVGEQNSWVWTCQAKPDSNYVVVGCQDGTISFYQLIFSTVHGLYKDRYAYRDSMTDVIV
QHLITEQKVRIKCKELVKKIAIYRNRLAIQLPEKILYELYSEDLSDMHYRVKEKIIKKFECNLLVC
ANHIILCQEKRLQCLSFSGVKEREWQMESLIRYIKVIGGPPGREGLLVGLKNGQILKIFVDNLFIVL
LKQATAVRCLDMSASRKKLAVVDENDTCLVYDIDTKELLFQEPNANSVAWNTQCEDMLCFSGG
GYLNIKASTFPVHRQKLQGFVVGNGSKIFCLHVFSISAVEVPQSAPMYQYLDRKLFKEAYQIACL
GVTDTDWRELAMEALEGLDFETAKKAFIRVQDLRYLELISSIEERKKRGETNNDLFLADVFSYQG
KFHEAAKLYKRSGHENLAEMYTDLCMFEYAKDFLGSGDPKETKMLITKQADWARNIKEPKAAV
EMYISAGEHVKAIEICGDHGWVMDLIDIAARKLDAEREPLLLCATYLLKLDSPGYAAETYLKMGD
LKSLVQLHVETQRWDEAFALGEKHPEFKDDIYMPYAQWLAENDRFEEAQKAFHKAGRQREAVQ
VLEQLTNNVAESRFNDAAYYYWMLSMQCLDIAQDPAQKDTMLGKFYHFQRLAELYHGYHAIH
RHTEDPFSVHRPETLFNISRFLHSLPKDTPSGISKVKILFTLAKQSKALGAYRLARHAYDKLRGLYI
PARFQKSIELGTLTIRAKPFHDSEELVPLCYRCSTNNPLNNGVNCINCRQPFIFSASSYDVLHLVE
FYLEEGITDEEAISLIDLEVLPRKRDDRQLEIANSSQILRLVETKDSIGDEDPFTAKLSFEQGGSEFV
PVVVSRLVLRSMRRDVLIKRWPPPLRWQYFRSLLPDASITMCPSCFQMFHSEDYELLVLQHGCCP
YCRCKDDPGP (SEQ ID NO: 36)

FIG. 13C

Caenorhabditis elegans

>Ce_Daf10 Z82266 F23B2.4
MTMKKISRKLGFHGEQVCIYDLAFKPDGSELLLAADNKVYLFDVNEGGQMOTLKGHKDLVYTV
AWSHNGELFASGGADKLVLWNEKHEGTLRYSHTDVIQCMFNPNCQILLTCALNEFGLWSTAD
KNVIKQRSVVRCCSCAWNTDGTIFAIGHGDGTITLRKGTNATEEPSIIIQRDNEPIWGIAFSSNRTFA
SRDSQGNPMGIDEIMAVIDWNKTLFSYSLDGTIFIESKNLEFEPHCISYCLNGEYLLIGGSDKILKIYT
RKGVLLGTVAQMDHWIWSVTVRPNSTVAMGCVDTIACYNLVFSTVHCVDHARYANRKSMT
DVFVQNLEYRTSSNICCHDLVKKMSLYDTKLAVQLSDKIQIYKQTGGVSKNERRKQLKYTLQDTI
RKDLSFSLMVVTHGHLVVCNDEKLECYDFKGIKKRSWNMKSIVRYLRVLGGPAHRETLVLGTTD
GGVYKVFIDNDYPILLDSRKTAKCIDINANRTVLASIEDTLVCKWSDIATGETLLQEPGCYSVVFN
TVNENLFAFTTNMLHVRTLAAPGHTRGVGYVLGFVKNRTFCLVQYNLIPLEVPYTIHLVYQYIER
GDFKEALRIACLGVVKNWLYLANKALDALEFDVARKAYKRVRDRKMLRMVWELKKMKSN
EPDAILRATILAYTKKFREAAKIFKENGFNAMELFTDMRMFDDVQEVMTTASGETKKMLMRK
RASWARDANQPKIAAEMLISSGDLDAALLIIDNDWLELAIEISHKIDRSLETMKKLSAYFIRKHE
FGLASRIFQSINDMKSIIVDMHVNAGHWTDFAIADRHYPKYVEDVYLPYARFLAERDRFEEAQKAF
HRAGKEQEAMHVLEQLTSNSVNNRFAADAGCGLNPLLGGMSCIH CETPFIISFVSFDILPLIEFKIE
NDISFDEAKELIESEPPLSDDDYNNPLRGLKKGIKEIILNRESLSKLEQGHVVIQTFFPPLAPKFLFNVM
SITIAQCKGCNKVFDLDDFEMA CLRKGHCPCRTSYDRNEAFFVDEEDEDNTNIPSGQFSRFS

(SEQ ID NO: 37)

FIG. 13D

IFT139

Chlamydomonas

>Cr_IFT139 partial predicted peptide sequence (lacking C-terminal end)

MADRVLALVHYYAREGYFRHVQTVCEVLKKRPGDGVLTFRAYGLLMEGNTADAMRDLSSIQ
GNSDLELAVAAAQLLGHESAKVPDHDAILDLQAKLEIEERTASDQPCLHLASFYLYTKSKERARGL
VERVLRNQPDMPAQVLLGWIIISQQQDDEYDMLFDESELDDALSHFEQAVEHDHNDLQALLGK
AKIMELKKQLGPCLDVLTEINVRFGWFPALVEKTRMLMMLGDWEQVTETLQRVLAADQQNIM
AQAWNCMISLTREGNNKQAAQLQDLFSSMNREQPKNAELFFRVARPFGRACSDPTLLGITYLM
ADRAAQLRPEMAAYVVEAAAQKLMMDETTNATERFTQALQLDELNLEANAGALEAQIMAGELE
EAAGQIMFLEDMFTNAAAAGGGKRRKGRGTGDMDDDPDMADPSLGTSSDNPTLLYLKGLLAWKQ
GMPSEGLGLLERSIAALFSAAADFHGPSLELYAALNPARITAMVRLLLQSIGGEPRAPTEAPSPLISK
VTRALDLLNKQAPALQESALLHARALYLNGLDGLRKAGEILRMNPEESSAHLICSVYVAQDK
PELAVSALDQAVSSNFAIRETPLYHVVQAKVLVANNNKLDDAKRVLESAMNLPGVRTALTQQRA
RLGRKVVEPTLHERATVYLLLADVLRQSKIPDAPEAKKYIQDAIREFEGTSEEVRTVADCELA
ARGDVEGALKKLRIPKESPHYVKARMAMADIYLRIRKDKAAYIKCYMDLVDHTPDYDSYCM
GEAFMQIQEPEKAVRA (SEQ ID NO: 20)

FIG. 14A

FIG. 14A

>Cr_IFT139 partial Cdna sequence (lacking 3' end)

GGGTAGTCGTAACGTCTCAAGTATCGGACGCACTATTTGCAACTGCTTATTTTCGCATGGCTCC
CCCATCAATGAACTTGCTTCGTCCCTATGGCCTCCCATCGAGCGTGCAAGGTATCACCGTGTAT
ACACATGCTAAATATACTTCGTTAAATTGGAGTTCACCGCGGAGGCCTGAACATTTGCCGAAC
CGCTCCTGAGGAAGCAGAACGAATAGCAGTGCATACAAATAGCCATGGCGGACAGGGTACTT
GCCCTGGTCCATTACTATGCTCGCGAGGGCTATTTTAGACATGTGCAGACGGTGTGCAACGAA
GTGCTCAAGAAGCGGCCGGGAGATGGCGTACTCACATTCTGGCGTGCCTATGGACTGCTCATG
GAGGGCAACACGGCGGACGCCATGCGTGACCTCTCCAGCATCCAGGGCAATTCTGACCTTGA
GCTGGCGGTGCGAGCCGCGCAACTACTGGGTCACGAATCCGCCAAGGTGCCCCACCACGATG
CCATCATTGACCTCCAAGCCAAGCTGGAGATCGAGGAGCGCACCGCCAGCGACCAGCCCTGC
CTGCACCTGGCCTCCTTCTACCTGTATACCAAGTCCAAGGAGCGCGCCCCGGGTCTGGTGGAG
CGCGTGCTGCGCAACCAGCCCCGACATGGTGCCGGCGCAGGTTCTTCTGGGCTGGATCATCATC
AGCCAGCAGCAGGACGACGAGTACGACATGCTGTTTGACGAGTCCGAGCTGGACGACGCCCT
CAGCCACTTCGAGCAGGCGGTGGAGCACGACCACAACGACCTGCAGGCGCTGCTGGGCAAAG
CCAAGATCATGGAGCTGAAGAAGCAGCTGGGGCCCTGCCTGGACGTGCTGACGGAGATCAAC
GTGCGCTTCGGCTGGTTCGTGCCGGCGCTGGTGGAAAAGACGCGCATGCTCATGATGCTGGG
GACTGGGAGCAGGTGACGGAGACGCTGCAGCGGTGCTTGCGGCGGACCAACAGAACATCAT
GGCGCAGGCCTGGAAGTGCATGATCTCCCTCACTCGCGAGGGCAACAACAAGCAGGCGGCCA
AGCAGTGCAGGACCTGTTTACGCTCAATGAACCGCCAGGAGCCCAAGAACGCCGAGCTCTTC
TTCCGCGTCGCCCCGGCCCCCTCGGGCCGCTGGCCTGCAGCGACCCACGCTGCTGGGCATCACC
TACCTCATGGCCGACCGCGCCGCGCAGCTCAGGCCGGAGATGGCGGCCTACGTGGTGGAGGC
AGCTGCTCAGAAGCTGATGATGGACGAGACCACCAACGCCACGGAGCGCTTCACGCAGGCGC
TACAGCTGGACGAGCTGAACCTGGAGGCCAACCGGGCGCGCTGGAGGCGCAGATCATGGCG
GGCGAGCTGGAGGAGGCGGCGGGGCGAGATCATGTTCTGGAGGACATGTTACCAACGCCCG
GGCGGCTGGCGGCGGCAAGCGCAAGGGCCGCGGCACCGGCGACATGGACGACGACCCCGAT
ATGGCCGACCCAGTCTGGGCACCTCCTCCGACAACCCACGCTGCTCTACCTCAAGGGTCTG
CTGGCCTGGAAGCAGGGCATGCCGTCCGAGGGCCTGGGTCTGCTGGAGCGCTCCATTGCCGCC
CTGTTCTCCGCCGCCGCCGACTTCCACGGCCCCAGCCTGGAGCTGTACGCGGCGCTCAACCCG
GCGCGCATCACCGCAATGGTGCGGCTGCTGCTGCAGAGCATCGGCGGTGAGCCGCGCGCTCC
CACTGAGGCGCCGTCTCCGCTCATCAGCAAGGTACCCGCGCGCTGGACCTGCTGAACAAGCA
GGCGCCGCGCTGACAGGAGAGCGCGCTGCTGCACGCGCGCGCTGTACCTGAACGGCAACC
TGGACGGCGCGCTGCGCAAGGCGGGCGAGATCCTGCGCATGAACCCCGAGGAGAGCTCCGCG
CACCTGCTCATCTGTTCCGTGTACGTGGCGCAGGACAAGCCCGAGCTGGCCGTGAGCGCGCTG
GACCAGGCCGTGACGAGCAACTTCGCGATCCGCGAGACGCCTCTGTACCACGTGGTCCAGGCC
AAGGTGCTGGTGGCCAACAACAAGCTGGACGACGCCAAGCGCGTCTGAGTCCGCCATGAA
CCTGCCGGCGGTGCGCACAGCGCTCACCGTGACGAGCGCGCGGACTAGGGCGCAAGGTGG
TCGAGCCCCACGCTGCACGAGCGCGCCACCGTGACCTGCTGCTGGCGGACGTGCTGGCGAGG
CAGTCCAAGATACCGGACGCACAGAGGCCAAGAAGTACATCCAAGACGCCATCCGCGAGTT
CGAGGGCACGAGCGAGGAGGTGCGCGTCACGGTGGCGGACTGCGAGCTGGCCATTGCGCGCG
GCGACGTGGAGGGCGCGCTCAAGAAGCTGCGGCGCATCCCCAAGGAGTCTCCGCACTACGTG
AAGGCGCGCATGGCCATGGCCGACATCTACCTGCGCCACCGCAAGGACAAGGCCGCTACAT
CAAGTGCTACATGGACCTGGTGGACCACACGCCCGACTACGACAGCTACTGCATGCTGGGCG
AGGCGTTCATGCAGATCCAGGAGCCGGAGAAGGCAGTGCGCGCT

(SEQ ID NO: 19)

FIG. 14B

Human

>Hs_IFT139-1 ref|NT_005498.3|Hs3_5655 Homo sapiens chromosome 3
SFIQAGIIYYSSQEKYFHHVQAAAVGLEKFSNDPVLKFFKAYGVLKEDREAIQELEYSLKEIRKTVSG
TALYYAGLFLWLIGRHDKAKEYIDRMLKISRGFREAYVLRGWVDLTSDKPHTAKKAIEYLEQGIQ
DTKDVLGLMGKAMYFMMQQNYSEALEVVNQITVTSGSFLPALVLKMQFLARQDWEQTVEMG
HRRILEKDESNIDACQILTVHELAREGNMTTQATNHVRNLKALETREPENPSLHLKKIIVVSRVC
GSHQVILGLVCSFIERTFMATPSYVHVATELGYLFILKNQVKEALLWYSEAMKLDKDGMAGLTGII
LCHILEGHLEEAERYLFLKEVQKSLGKSEVRAPWGYGLLQDDVLCCPPTPTFQCKVAWTFPLPLP
TKSAQADIGTETRSSLPQVLIFLQALLMSRKHKGEEETTALLKEAVELHFSSMQGIPLGSEYFEKLD
PYFLVCIAKEYLLFCPKQPRLPQIVSPLLKQVAVILNPVVKAAPALIDPLYLMAQVRYYSGELEN
AQSIQRCLELDPASVDAHLLMCQIYLAQGNFGMCFHCELGVSNNFQVVRDHPLYHLIKARALN
KAGDYPEAIKTLKMKVILKALKKEEGRKFLRPSVQPSQASILLELVEALRLNGELHEATKVMQDT
INEFGGTPEENRITIANVDLVLSKGNVDVALNMLRNILPKQSCYMEAREKMANIYLQTLRDRRLYI
RCYELCEHLPGPHTSLLLDALMSILEVSRPHSLAKWPPSLPSPVGEKRTQRHFPHQPEKALEV
YDEAYRQNPHDASLASRIGHAYVKAHQYTKAIEYYEAAQKINGQDFLCCDLGKLLKLKKVKA
EKVLKQALEHDIGVQDIPSMMDVKCLLLAKVYKSHKKEAVIETLNKVIDRWTQALALDLQSR
LKRVPLEQPEMIPSQKQLAASICIQFAEHYLAKEYDKAVQSYKDVFSYLPTDNKVLMAADLMFRK
QKHEAAILNYHQVLEKAPGDNFLVLHKLIDLLRRSGKLEDIPAFFELAKKVSSRVPLEPGFNCRGI
YCWHIGQPNEALKFLNKARKDSTWGQSAIYHMQICLNPDNEVVGGEAFENLIPRSNTCSYMEKK
ELEQQGVSTAELKLLREFYPHSDSSQTQLRLLQGLCLRLATREKANMEAALGSFIQIAQAEKDSVPAL
LALAQAAYVFLKQIPKARMQLKRLAKTPWVLSEAEDLEKSWLLADIYQCGSKFDLLELLRRCVQ
YNKAQSCYKAYEYMGFIMEKEQSYKDAVTNYKLAWKYSHHANPAIGKATSQGARETWEGGGQ
EPHHDPRQTQGLYPGCYENQRGSQVTRVPPSLLSMSPVGFKLAFNYLKDKKFVEAIEICNDVSQQP
WWGGPGVVVGNA (SEQ ID NO: 38)

FIG. 14C

>Hs_IFT139-2 ref|NT_005239.3|Hs2_5396 Homo sapiens chromosome 2
INYYCQERYFHHVLLVASEGIKRYGSDPVFRFYHAYGTLMEGKTQEALREFEAIKNKQDVSLCSLL
ALIIAHKDREAILESARVKEQRKGAGEKALYHAGLFLWHIGRHDKAKEYIDRMKISDGSKQGH
VLKAWLDITRGKEPYTKKALKYFEEGLQDGNDFALLGKVSQRQNYSGALETVNQIIVNFPSPFLP
AFVKKMKLQALQDWDQTVETAQRLSNKIIFFSFCGRSQLILQKIQTLLERAFSLNPQQSEFATELG
YQMILQGRVKEALKWYKTAM TLDTSVSALVGFIQCQLIEGQLQDADQQLFLNEIQSIGKSAV
LIYLHAVLAMKKNKRQEEVINLLNDVLDTHFSQLEGLPLGIQYFEKLNPDFLLEIVMEYLSFCPMQ
VSNYGFLLDIEAAFNLLQHCHLEHNPSYADAHLLLAQVYLSQEKVKLCSQSLELCLSYDFKVQVR
DYPLYHLIKAQSQKKMGEIADAIAKTLHMAMSLPGMKRIGASTKSKDRKTEVDTSRHSIFLELIDV
HRLNGEHEATKVLQDAIHEFSGTSEEVRTIANADLALAQQDIERALSILQNVTAEQPYFIEAREK
MADIYKHKRDKMLYITCFITYEAAKLTGQKNYLCYDLAELLLKLKWDYDKAEKVLQHALAH
EPGMKARELQARVLKRVQMEQPDAPPAQKHLAAEICAIEIAKHSVAQRDYEKAIFKYREALVHCE
TDNKVDNYMTLSRLIDLLRRCGKLEDVPRFFSMAEKRSRAKLEPGFYCKGLYLWYTGEPNDA
LRHFNKARKDRDWGNALYNMIEICLNPDNETVGGEVFENLDGDSNSTEKQESVQLAVRTAEKL
LKEKLPQTVQGHVQLRIMENYCLMATKQKSNVEQALNTFTEIAASEKEHIPALLGMATAYMILKQ
TPRARNQLKRIAKMNWNAIDAEFEKSWLLADIYIQSAKYDMAEDLLKRCLRHNRSCCKAYEY
MGYIMEKEQAYTDAALNYEMAWKYSNRTNPAVG (SEQ ID NO: 39)

FIG. 14D

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96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

>gi|7511091|pir||T29012 hypothetical protein ZK328.7 - *Caenorhabditis elegans*
MKVAANELAISTIHFLPGHIEKAKASIMMKDWRGVMDCIMNADQPEGSNPYIEVLRTVHGCYAG
EVSMCLKRTLQLLKSLDENEATNHVLYARITKLLVSISGRDEKILRHARDFLTRALKISRKPDYVAL
SMRIAFGLGGAKEVSTLSQELVALDCEDSYAVLSSVVSMLMISRVS DARAQFDILPSAHPKLLSEPI
YYLIASVLAKQSKDKSFENFRQHIE NLVEMLRNQLQSFPFLDYLSLFSDDL YSAVEQC FDFYPLV
PIKAPDDCMKLTAKTLQMIYDVAPGLAHCT LQLARNSYLC SNTNAAEKWIEKVLDKDDSLADAH
LRAELILDRGGKITDADDALVTGLNFNFKLRETSLYHLIKSKTFKKRNENDEAIKTLKMALQIPRKE
PSKNLFQPKESADTHKISVQLELIDTLQHMKRIQE AETMTDALAEWAGQPEQDQLVIAQAQLYL
TKGHVERALGILKKIQPGQSNFHL SRIKMAEIYLEEKDKRMFAACYRELLKVEATPGSYSL LGDA
FMKVQEPEDAINFYEQALKMQSKDVQLAEKIGEAYVMAHLYSKAVNFYESSMNIYKDKNMRLK
LANLLKL RNF EKCEKVLRAPFERDPEPVGTETIQT YIQFLLLAE CHEMMDNVP EAMNDFEAKS
LHSRIQDKTLTAALKKEGARICNLQAE LLYRRREFSQAVDICKQALAYHETDLKANLLSKIFKEE
NKWTLVLQPCQTVIQVDPHNDEANSILADFYIRSEAAHASTSYTLLNTNPQHWHALS RVVELF
CRNGEQNAAEKHLDRAKEVNPRCVTESGYNVCRGF EWTG DQNEALRYYSRTKDSAAGWREK
ALYMYHIDICLNP DNEI I DENSVENPETTKI IYLVSELWKKLVNSKNLPNITSIYSENFQSTDRFL LAQ
NFIRMHTLTDKSAIQAEALDEFNRMAFNADRSQVTNVGAVFGVARGHVLLKQVQKAKTVLKMVNG
RVWNFDDSDYLEK CWLMLADIYINQNKNDQAVTFLDLVFKYNCNCLKAFELYGYMREKEQKYV
EAYKMYEKAFMATKERNPGFGYKLAFTY LKAKRLFACIETCQKVLDLNPQYPKIKKEIMDKAKA
LIRT
(SEQ ID NO: 40)

(SEQ ID NO: 40)

FIG. 14E

Che-2

Chlamydomonas

>Cr_Che-2 predicted peptide sequence

MRLKVKQSSANVHSELTAAGVGNVWNLFTCSDDQTIHKWNMLGEPEQKVSTLDAYFTDMHW
YPVSSKKTQAGGTDVFAVACTDGSVKILSRTGRVEKSIEGHKGACISLRWSYDGTALATAGEDGS
VKIWSRNGMLRSTLAQADSPVYSIVWAYDCDQLCYCTGSNNVIKSLSSNAKQNAWKAHDGVVL
KVDWSPINHLIITGGEDCKYKVWDSFGRLLFQSGLFDPVTSVAWAPSGELFAVGGFNTLQLCDR
MGWAYSКИHLNDTGSIMTLSWTADSTQLAGGGGSGGVVFGQVVDLALEDGKMQVTVDDMRIV
VNDILNENADELPEFRDRVIKVS LGYGYLIVATATQCHVYNTTNLGTPHIFDLKDTVTL LQAERH
FLLDNSAGIQIYTYEGRQICNPRFQGLRTELLNAQMITLSNDTIAVLDQQASGTTVRFFDTAQGRP
VGEPWQHTLEVKEIALSQAGTINDRQLIVIDRNRDLYLLPVMKRHVAKLAAMCDSARWHDSTAM
LSAMVDQRLCVWYYPSEVYVDKDLLAKTRYTKSDSDFGKSAQIQLFAGNRCLVRRSDGVLVSAA
TSPYPAVLYDMIRKQQWDKATRLCRFIKDPTMWATLAAMAMA AKELNTAEVAF AAIDEVDKTH
FVRKVKQIPTEEGRNAELAVYRRKPEGESILLQAGLVFRAIKLNIKLFNWERALXLATQHKQH QD
TVLWYRQQFLKNAKLAESITRFMQMNESVVVDQAAVKKKIEEERIKESQRPGAKRYV

(SEQ ID NO: 22)

FIG. 15A

FIG. 15A

>Cr_Che-2 cDNA sequence

ATGCGTCTCAAGGTCAAGCAGTCCAGCGCGAATGTGCACAGCGAATTAACAGCAGCTGTGGG
CTGGAATGTCTGGAATGAACTGTTCACTTGTAGCGACGACCAGACTATTACAAATGGAACAT
GCTGGGGGAGCCAGAGCAGAAGGTCAGCACTCTGGACGCATACTTCACGGATATGCACTGGT
ACCCCGTGAGCTCGAAGAAGACGCAAGCAGGCGGGACGGACGTATTCGCGGTGGCGTGACAA
GACGGCTCTGTAAAAATCCTCAGCCGCACGGGCCGCGTGGAGAAGTCCATTGAGGGGACAAA
GGGCGCGTGATCTCGCTGCGCTGGAGCTATGACGGGACGGCACTGGCGACGGCGGGCGAGG
ACGGGTCGGTAAAGATCTGGTCGCGCAACGGCATGCTGCGCTCCACGCTAGCGCAGGCGGAC
AGCCCCGTGTACTCGATTGTGTGGGCTACGACTGCGACCAGCTGTGCTACTGCACCGGCTCC
AACGTGGTCAAGTCGCTGTCTCCAACGCCAAGCAGAACGCGTGGAAGGCGCACGACGG
CGTGGTGCTCAAGGTGGACTGGAGCCCCATCAACCACCTCATCATCACAGGCGGGCAGGACT
GCAAGTACAAGGTGTGGGACAGCTTTGGGCGGCTGCTGTTCCAGAGCGGGCTGTTCCGACTACC
CGGTACAGTCGGTGGCGTGGGCGCCAGCGGCGAGCTGTTCCGCGTGGGCGGCTTCAACACG
CTGCAGCTGTGTGACCGCATGGGCTGGGCTACTCCAAGATCCACCTCAACGACACGGGCAGC
ATCATGACTCTGAGCTGGACGGGACAGCAGCAGCAGCTGGCGGGCGGCGGCGGCGGCGG
CGTGGTGTTCCGGCAGGTGGTGGACCTGGCGCTGGAGGACGGCAAGATGCAGGTGACGGTGG
TGGACGACATGCGCATTGTGGTGAACGACATCTTGAACGAGAACGCGGACGAGCTGCCCGAG
TTCCGTGACCGCGTCATCAAGGTGTCGCTAGGGTACGGCTACCTGATCGTGGCCACCGCGACG
CAGTGCCACGTGTACAACACCACCAACCTGGGCACGCCGCACATCTTTGACCTCAAAGACAG
GTCACCCTGCTGCTGCAGGCTGAGCGGCACTTCTGCTGCTGGACAACCTCGGCGGGCATCCAG
ATCTACACCTACGAGGGCCGCCAGATCTGCAACCCGCGCTTCCAGGGCCTGCGCACCGAGCTG
CTGAACGCGCAGATGATCACGCTGTCCAACGACACGATAGCGGTGCTGGACCAGCAGGCCAG
CGGCACCACCGTGCGCTTCTTCGACACGGCGCAGGGCCGGCCAGTGGGCGAGCCGTGGCAGC
ACACGTTGGAGGTGAAGGAGATCGCGCTGAGCCAGGCCGGCACCATCAACGACCGCCAGCTC
ATCGTCATCGACCGCAACCGCGACCTGTACCTGCTGCCCGTCATGAAGCGCCACGTGGCCAAG
CTGGCGGCCATGTGCGACTCGGCGCGCTGGCACGACAGCACCGCCATGCTGTCCGCCATGGTG
GACCAGCGCCTGTGTGTGTGGTACTACCCAGCGAGGTGTACGTGGACAAGGACCTGCTGGCC
AAGACGCGCTACACCAAGTCCGACTCGGACTTTGGCAAGTCGGCCCAGATCCAGCTCTTCGCC
GGCAACCGCTGCCTGGTGGCGCCGCTCCGACGGCGTGCTGGTCTCCGCCGCCACCTCGCCCTAC
CCTGCCGTACTGTACGACATGATCCGCAAGCAGCAGTGGGACAAGGCCACGCGGCTGTGTGCG
CTTCATCAAGGACCCACCATGTGGGCCACGCTGGCGGCGATGGCCATGGCGGCTAAGGAGC
TGAACACGGCGGAGGTGGCGTTCGCGCGATTGACGAGGTGGACAAAACGCACCTTTGTGCGC
AAGGTGAAGCAGATCCCCACGGAGGAGGGCCGCAACGCCGAGCTGGCGGTGTACCGGCGCA
AGCCCCGAGGAGGGCGAGTCCATACTGCTGCAGGCCGCGCTGGTCTTCCGCGCCATCAAGCTG
AACATCAAGCTGTTCAACTGGGAGCGCGCTGSACCTGGCCACGCAGCACAAGCAGCACCA
GGACACGGTGCTGTGGTACCGCCAGCAGTTCCTCAAGAACGCCAAGCTCGCCGAGTCCATCAC
GCGCTTCATGCAGATGAACGAGTCGGTGGTTGTGGACCAGGCGGCGGTGAAGAAGAAGATCG
AGGAGGAGCGCATCAAGGAGTCGACGCGGCCAGGCGCCAAGCGCTACGTGTAA

(SEQ ID NO: 21)

FIG. 15B

Human

>Hs_Che-2 gi|7243129|dbj|BAA92612.1| KIAA1374 protein [Homo sapiens]
IELVSCVGVTTAEELYSCSDDHQIVKWNLLTSETTQIVKLPDDIYPIDFWFPKSLGVKKQTQAESF
VLTSSDGKFHLISKLRVEKSVEAHCGAVLAGRWNYEGTALVTVGEDGQIKIWSKTGMLRSTLA
QQGTPVYSVAWGPDEKVLVYTAGKQLIIPQNAKVLQWKAHDGILKVDWNSVNDLILSAGED
CKYKVWDSYGRPLYNSQPHEHPITSVAWAPDGELFVGSFHTLRLCDKTGWSYALEKPNTGSIFN
IAWSIDGTQIAGACGNHVVFAHVVEQHWKWNFQVTLTKRRAMQVRNVLNDVLDLLEFRDRV
IKASLNYAHLVVSTSLQCYVFSTKNWNTPIIFDLKEGTVSLILQAERHFLLVDGSSIIYLSYEGRFIS
SPKFPGMRTDILNAQTVSLSNDTIAIRDKADEKIIFLFEASTGKPLGDGKFLSHKNEILEIALDQKGL
TNDRKIAFIDKNRDLCSITSVKRFGKEEQIILGTMVHTLAWNDTCNLCGLQDTRFIVWYYPNVTY
VDRDILPKTLYERDASEFSKNPHIVSFVGNQVTIRRADGSLVHISITPYPAILHEYVSSSKWEDAVRL
CRFVKEQTMWACLAAMAVANRDMTTAEIAYAAIGEIDKVQYINSIKNLPSKESKMAHILLFSGNI
QEAEIVLLQAGLVYQAIQININLYNWERALELAVKYKTHVDTVLAYRQKFLETFGKQETNKRYLH
YAEGQLIDWEKIKAKIEMEITKEREQSSSSQSSKSIGLKP (SEQ ID NO: 41)

FIG. 15C

Caenorhabditis elegans

>Ce_Che-2 gi|4468141|emb|CAB38019.1| CHE-2 protein [Caenorhabditis elegans]
MKLKLASARKTRHTEMVCGVGWIGTEAILSAAADDHVFLLTNTATNESQQILNMPETFFPTSLHIFP
RSQTKGGQNDVFAVSTSDGKINILSRNGKVENMVDHAHNGAALCARWNSDGTGLSSGEDGFVK
MWSRSGMLRSVLAQFATAVYCVAWDSTSSNVLYCNADHCYIKSLKMQVAPIKWKAHDGILCCD
WNPTSDLIVTGGEDLKFKVWDGFGQILFNSSVHDYPITSISWNTDGTFAVGSHNLRLCDKSGWS
HSLEKMNAGSVMALSWSPDGTQLAVGTAAGLVFHAHIIDKRLTYEEFEIVQTQKTVIEVRDVSSE
VSRETLETKERISKIAILYKYLIVVTSSHIYIYSSKNWNTPTMIEYNERTVNIIVQCEKIFLVSDGMTIT
IFTYEGRKLINLNPPGQVMALLDERKIDLANDTLVVRDRADNKVLHFFDPTTGKAQGDGNLKHEH
DIVELTVNQCGPLNDRNVAFRDQIGAVHIAMVKTFGVSQRMVKIGSLVEQLVFNDVTNMLCGISE
GKIAVWPLPNVAFHNRNLLQKSLIQKNIGSVGKFPQLANFAGNTIVIRKSDGCLLPTGILPFYGTLLT
MASQSKWDQAIRLCRSIGNDTMWATFAGLAVLHKNMIVMEIAYAALEDDEKVSLINEIKDKTDK
ETRQAMQVVLTGKLADADVLLERSGLSFRSLMLNIQMFKWKRALELGLKNKQWLEIVMGYREK
YLKNCGQKETDPLFLKHMSEVEIDWVHIRELIAAEKAKGN (SEQ ID NO: 42)

FIG. 15D

